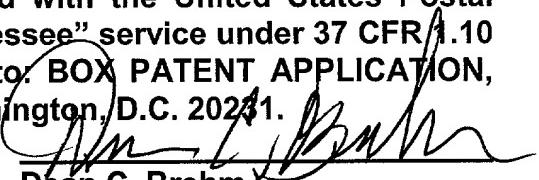


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Dean C. Brehm

**APPLICATION FOR
UNITED STATES LETTERS PATENT**

FOR

**APPARATUS AND METHOD FOR ORGANIZING
AND/OR PRESENTING DATA**

Inventor: David M. Holbrook



24923

PATENT & TRADEMARK OFFICE

CROSS REFERENCE TO RELATED APPLICATION

This application is related to a U.S. provisional application titled: "Apparatus,

Storage Medium, System and Methods for Organizing and/or Presenting Data" filed

November 15, 2000, serial number 60/248,802, which is hereby incorporated herein by

5 reference in its entirety and from which priority is claimed for the present application.

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to the field of database searching and in particular to the presentation of aggregate data base search results by an intuitive graphical user interface.

Background of the Related Art

Presently, many known Internet search engines accept a search request, such as a search string query, over Internet communication links from a user via a user's browser. The user's query initiates a search by a search of a database of web sites, or information about the content of various web sites, and returns "matching" web sites to the user. One such popular search engine is Yahoo.com. Internet search engines are described in U.S. Patent Number 5,933,822 to Braden-Harder et al, issued on August 3, 1999, assigned to Microsoft Corporation, entitled "Apparatus and Methods from an Information Retrieval System that Employs Natural Language Processing of Search Results to Improve Overall Precision," and is hereby incorporated herein by reference in its entirety.

Typically, Internet search engines rank search results in numerical order based upon some relevance criteria. Search engines typically download their search results comprising a numerical ranking as a sequential textual list of matching web sites, which is subsequently displayed by the user's browser. For example, the first page of a search result may provide a numerically ordered listing of the first 10 or 20 web sites matching a user's search criteria. To view a listing of the next 10 or 20 web sites, a new page of the

search results typically must be downloaded, and so on. The user typically accesses the list of the next 10 or 20 web sites by clicking on “next” icon at the bottom of the browser display page.

The textual list for each matching web site usually includes a short description of each respective web site and a “hyperlink” to the site to enable the user to access the web site. This typical prior art presentation of search results provides no further grouping of matching web sites. The numerically ordered group is presented in a textual long list. Oftentimes, the search results are altered to place certain results at the top of the list for a fee, whether or not they are most relevant to the user’s query.

Some search engines are capable of searching one or more databases of web sites that include numerous categories and subcategories among which the web sites are grouped. The categories can be organized, for example, in multiple layers, or levels, each such layer or level being more specific than the previous one, such as in a hierarchical “category tree”. For example, near the top level of such a tree, e.g., the first level below the root level, may contain numerous, perhaps 10 or 20 general or “parent” categories. For instance, Arts, Business, Sports, and Science may be examples of such parent categories. Each parent category may be further divided into more specific subcategories. For instance, a Sports category can be further subdivided into subcategories such as Baseball, Basketball, Football, and Hockey. Each first level subcategory can be further subdivided into even more specific (lower level) subcategories. For instance, the first level subcategory, Baseball, can be divided into second level subcategories, such as College, Fantasy, Major League, and Minor League. Some or all of the second level subcategories may be further divided into third level subcategories, and so on. This branching of the category tree continues as far as the web directory or database provides, until all categories and subcategories are included.

With the use of the category tree generally described above, each web site in the

database can be assigned or has a “category path.” For instance, for a search under the query “cars”, a search engine may identify numerous category paths for the matching web sites that satisfy the query. The following are examples of such category paths:

SPORTS: AUTO RACING: DRAG RACING: FUNNY CARS

5 HOME: CONSUMERS: INFORMATION: PRODUCT REVIEWS: AUTOS

ARTS: MUSIC: BANDS AND ARTISTS: C: THE CARS

SPORTS: AUTO RACING: DRAG RACING: PERSONAL

Referring to the first exemplary category path above, the first listed term “SPORTS” is referred to herein as the “parent category”, the next term “AUTO RACING” being the “first level subcategory” followed by the “second level subcategory” “DRAG RACING” and so on, each category/subcategory separated by a colon “:”.
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15

Some search engines are capable of downloading and presenting the user with the category paths associated with the matching web sites in the format of a list spanning numerous pages. This category path format provides a second conventional option for displaying search results, in addition to the aforementioned method of listing the matching web sites in numerically ranked order. Instead of presenting the user with a list of ranked web sites, this category path option presents a textual list of category paths.
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Prior art search engines may combine these two search result presentation formats. For example, the first exemplary format may be incorporated into the second format with the use of a hyperlink to a listing of the matching web sites that fall within a particular category path. In one example, text, such as “5 matches found”, may be shown adjacent the category path, such as “SPORTS: AUTO RACING: DRAG RACING: FUNNY CARS (5 matches found).” Selecting or clicking on the text “5 matches found” could lead to a listing of the web sites and links to the sites. Another known data presentation format lists the matching web sites of the category path directly underneath the category path name. Some existing search engines provide access to a listing of all

web sites in the entire web directory that fall within a particular category path, such as by the user selecting or clicking on the category path itself.

The prior art organization and presentation of search results or matching web sites present significant disadvantages. The search results presentation format, such as
5 described above, is cumbersome, difficult and/or time consuming to utilize, review, navigate, narrow and/or analyze. For example, the list of ranked web sites or category paths may span several web pages and require paging through hundreds or thousands of lines of text to evaluate search results. In example a disadvantage of known presentation format for search results, category paths that are closely associated with each other, such as SPORTS: AUTO RACING: DRAG RACING: FUNNY CARS and SPORTS: AUTO RACING: DRAG RACING: PERSONAL, may not even be on the same page of the search results causing sequential scrolling back and forth between pages of search results. Another disadvantages is that in known presentation formats, category paths may be included in the matching category list for which no matching web sites exist. These empty category paths are included because the words in the category paths themselves match the query string. These category path search results may be considered entirely or substantially useless and severely degrade the utility of search results, making them even more difficult to use and navigate. Thus, there is a need for a database search result presentation and navigation method and apparatus that concisely presents aggregate
10 relevant data to the user and enables the user to efficiently evaluate and review the entire results.
15

SUMMARY OF THE INVENTION

25 The present invention presents a user-friendly, intuitive graphical user interface for the presentation and review of search results from any hierarchically organized

database. The present invention presents a three dimensional graphical user interface (GUI) that enables the navigation of an unstructured list of data elements; e.g., search results of a database. The present invention has the following features: (a) the data elements are classified within the leaf-nodes or intermediate nodes of a hierarchical category node tree; e.g., a library structure; (b) the engine for building the GUI utilizes only the two attributes per data element: (i) a text string indicating the category path, and (ii) a URL for accessing the data element, an optional data element description or excerpt (e.g., JPEG, MPEG, or audio) may also be included; (c) the present invention enables implementation of a simple API utilizing the aforementioned two GUI attributes. The GUI engine operates independently of the library structure associated with the accessed database; (d) the GUI displays one hierarchical level at a time; (e) all aggregate data elements for a displayed category are presented with paths that are implied, i.e., data element paths not expressly presented however, can optionally be presented; each level displays all matching sibling category nodes; and (g) any displayed category node can be “drilled-down” to the next lower hierarchical level of the category tree or “drilled out” to immediately access a data element. Further, in one GUI version, each category node is presented as a circle with the node’s corresponding category name. The size of the category node circle indicates the number of elements aggregate to that node, relative to the total number of data elements. The relative size of the category nodes may linear, logarithmic or based on another relative sizing formula to enable a visualization of all displayed category nodes on a single display. The aggregate data elements of a category node are those elements that are classified within any leaf-node or intermediate level node that falls below the displayed category node in the hierarchical order. The

aggregate number of data elements is also displayed within the circle. In an alternative version, the GUI of the present invention displays a subset of the list of data elements, e.g., the first 50, with the elements aggregate to a category node explicitly displayed as icons arranged in a cluster around the node's category name. Category members or data elements with category icons displayed are shape or color coded to indicate subsequent sub-categories with the displayed category icon. At any point during the GUI navigation, selecting any displayed category member icon will either display an optional element description or excerpt or enable the user to "drill-out" (access the data) on a desired element without having to completely "drill-down" (successively visit each subsequent level of the categories to access the lowest level node and data element) the GUI. The present invention downloads a program or script to generate HTML at the client to display each and every GUI graphical data presentation without having to access the server again for additional HTML instructions.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGURE 1 is a block diagram of a preferred computer system;

FIGURE 2 is an illustration of a preferred short screen;

FIGURE 3 is an illustration of a preferred search results presentation;

FIGURE 4 is an illustration of a preferred search results presentation;

FIGURE 5 is an illustration of a preferred search results presentation;

FIGURE 6 is an illustration of a preferred search results presentation;

FIGURE 7 is an illustration of a option in a preferred presentation;

FIGURE 8 is an illustration of a option in a preferred presentation;

FIGURE 9 is an illustration of a textual presentation;

FIGURE 10 is an illustration of a GUI software script;

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FIGURE 11 illustrates a flow chart for a preferred embodiment;

FIGURE 12 illustrates a flow chart for a preferred embodiment;

FIGURE 13 illustrates a preferred code segment;

FIGURE 14 illustrates a preferred code segment;

FIGURE 15a illustrates a preferred code segment;

FIGURE 15b illustrates a preferred code segment;

FIGURE 16 illustrates a preferred GUI;

FIGURE 17 illustrates a preferred GUI;

FIGURE 18 illustrates a preferred code segment for rendering a preferred GUI;

FIGURE 19 illustrates a preferred code segment for rendering a preferred GUI;

FIGURE 20 illustrates a preferred code segment for rendering a preferred GUI;

FIGURE 21 is an illustration of a preferred presentation showing an extended list of matching categories;

FIGURE 22 is an illustration showing an alternative presentation;

FIGURE 23 is an illustration showing an alternative presentation;

FIGURE 24 is an illustration showing an alternative presentation;

FIGURE 25 illustrates preferred code segment;

FIGURE 26 illustrates preferred code segment;

FIGURE 27 illustrates preferred code segment;

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FIGURE 28 illustrates a preferred category search list;

FIGURE 29 illustrates a flow chart;

FIGURE 30 illustrates a preferred generic XML API

FIGURE 31 illustrates a preferred XML;

FIGURE 32 illustrates a preferred XML API;

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FIGURE 33 illustrates a preferred XML API;

FIGURE 34 illustrates two levels of hierarchy presented with aggregate data.

DETAILED DESCRIPTION A PREFERRED EMBODIMENT

It should be understood that the present invention is not limited to the embodiments described herein or shown in the attached drawings. Further, nothing in the
5 following detailed description or attached drawings should limit the scope or use of the present invention, but should only serve as examples of an embodiment of the present invention, as a written description of at least one embodiment of the present invention and the manner and process of making and using the present invention sufficient to enable any person skilled in the art to make and use the invention, and as setting forth the
10 best mode presently contemplated by the inventor of carrying out the present invention.

In a preferred embodiment, the present invention comprises apparatus, storage media, systems and methods capable of accomplishing at least one of the following: (1) separating, categorizing and/or graphically displaying numerous web sites or data base elements based upon their respective parent categories, subcategories, category paths or a combination thereof; (2) distinguishing various web sites or other data base elements from each other for display on one or more web pages or screens using text, images, color coding, other methods or any combination thereof; (3) displaying representations of matching web sites or data base elements to a search query on a single web page or screen; (4) providing multiple web pages or screens showing matching web sites in
15 different formats, such as graphically and textually, and/or in different contexts, such as in the context of parent categories and all or some levels of subcategories; (5) graphically displaying aggregate data with implied path information with drill down and drill out capability; and (6) any combination of (1) - (5) to provide a navigable, multi-tiered set of web pages or screens, and, if desired, also showing matching web sites or data base
20 elements by rank number and providing a hyperlink to each such web site or data base element.
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It should be understood that the present invention is not limited to the above, and further capabilities and functions that may be included. Numerous other features, objects and advantages of the invention will become apparent when the following detailed description of preferred embodiments is read in conjunction with the appended drawings
5 which illustrate such embodiments. The term “user” and variations thereof means one or more persons, entity or electronic media conducting a search, interested in search results or viewing search results or a database. The present invention is not and should not be limited in any way by who or what is or can be a user.

The terms “select”, “clicking” and variations thereof means the selection of an
10 option or variable described herein or provided by the present invention to the user or depicted (such as by demarcated text or an icon) on a computer display, screen or other mechanism during use of the present invention, and can be accomplished in any suitable manner, such as without limitation by the user clicking the computer pointer device on the area of the screen where an option is displayed, by touch, by voice or by using one or
15 more keys on the computer keyboard. The present invention is not and should not be limited in any way by the methods or mechanisms used for selection.

The term “Internet” and variations thereof means the Internet or World Wide Web, such as described, for example, in US Patent No. 5,960,411 to Harman et al, issued on September 28, 1999 and entitled “Method and System for Placing a Purchase Order
20 Via a Communications Network”, which is hereby incorporated by reference herein in its entirety. The Internet is used herein as merely an example of an information retrieval system with which the present invention can be used. The present invention can be used with any suitable information retrieval system, communications or computer network (such as a LAN or WAN). The present invention is not and should not be limited in any
25 way by the system or methods or mechanisms with which it is used. The present invention is suitable for display of hierarchical search results from any data base.

The present invention includes apparatus, storage media, systems and methods useful for organizing, presenting and/or communicating information. The invention includes apparatus, storage media, systems and methods for organizing, presenting and/or communicating data obtained from an information retrieval system. The invention
5 includes embodiments of systems, apparatus, storage media and methods for organizing and presenting the search results obtained by an information or database search conducted over an information retrieval or communications system. The present invention includes business methods, computer hardware and software capable of organizing and presenting the search results of a search conducted over the Internet.

10 As used in this document, the terms “search engine”, “conventional search engine” and variations thereof mean computer programs or code, program instructions, software or other media capable of performing a search of data or making information accessible via the Internet conducted. Conventional search engines typically reside on “server” computers. A person having access to the Internet can access and use such
15 search engines through browser, or other, software that may reside, for example, on a “client” computer. Client and server computers are connected as is known in the art, such as by communication links over the Internet. The browser or other software on the client computer is capable of sending requests to server computers and displaying web pages downloaded from server computers. There are or in the future may be other methods of
20 accessing search engines and conducting searches on the Internet or other computer networks or information retrieval systems. The present invention may be useful, for example, with any type of automated, electronic or computerized information retrieval system and any mechanism or method, such as computer program instructions or software, or other technology, for searching data accessible therewith and is not limited
25 in any way thereby.

The present invention is useful to traverse and graphically display any

hierarchical file structure, for example, Windows Explorer or a genealogical family tree. Files or data elements may comprise video, picture, text or sound. The present invention hides explicit downward path information, however, downward path information is implied and made explicit in graphical format as an option by left clicking on a category member icon and selecting a downward path option. The present invention is also useful to provide advertisements within category icons to increase click through for advertisers therein.

It will also be appreciated that the teachings of the present invention may be advantageously applied to other uses. For example, Microsoft ® Windows ® visually presents computer files in a folder-subfolder format. In this format, folders and subfolders must be consecutively selected to ultimately reach the resident data files. In contrast, the present invention may be used to immediately display the same resident files, but with implied paths. Thus, the present invention may be an effective substitute or alternative to the folder-subfolder scheme. In still another application, the present invention may be configured as a software application that is used to access files such as scanned photographs. "Thumbnails" of those photographs can, for example, be shown in the pop-up menu that appears as a mouse scrolls over the category members. In still another application, the present invention may be configured as a software application that tracks and presents information relating to the genealogy of a family. For example, conventional genealogy-related software applications generate pyramid or tree shaped charts that depict the genealogical relationship between members of a family. The present invention may also be used to show genealogical relationships. Most advantageously, the present invention can illustrate the relationship between family members without the clutter of intermediate family members; *i.e.*, all the great-grand children of a person may be shown can be shown without showing the children and grandchildren of that person (of course, those family members are the "implied paths").

FIG. 1 is a block diagram illustrating the overall general computer configuration of one embodiment of the present invention. It should be understood that the present invention is not limited in any way to the following description or any particular computer configuration. Further, the hardware and/or software and/or other apparatus or medium used to practice the present invention in no way limits the present invention.

The server side **104** of the exemplary computer network **100** of **FIG. 1** includes one or more server computer systems **104a** or other hardware capable of storing and allowing operation of Common Gateway Interface (CGI) computer software **105a** as well as the storage of various data files **105b** for retrieval by the client's browser **102**, according to the present invention, and one or more server computer systems **104b** or other hardware for storing and allowing the operation of a search engine computer program **108**. Path **106** indicates a network connection between the CGI software **105a** and the search engine program **108**, such as via the Internet as is or becomes known in the art. Any other suitable hardware for storing, allowing the operation and intercommunication of the CGI software **105a** and search engine **108** may be used.

The client side **101** (where the user operates) of this embodiment includes browser computer software **102**, such as Microsoft Internet Explorer 4.0, operating on a typical computer system **101a**. The browser program **102** is capable of receiving web pages from and sending requests to the server side **104**. The computer system **101a** of this embodiment can be any system suitable for use with the browser software. For example, the computer system **101a** may include one or more of various input devices and capabilities, such as a keyboard, pointer device, touch screen and/or voice activated mechanisms. The pointer device can be a mouse, track ball, touch screen, cursor, control key(s) and/or any other input mechanism or method that is or becomes known in the art.

The computer system **101a** of this embodiment also includes a monitor with a screen display and a processor, such as a CPU. The processor may, for example, be a general

purpose processor or a special purpose processor with image processing capabilities. The system **101a** may also include any among various types of internal memory, including RAM and ROM, and/or external storage, such as disks, CD ROMs, ASICs, external RAM or external ROM.

5 The server and client sides **104**, **101** of **FIG. 1** interact as is or becomes known in the art, such as via conventional communications lines or links **103** and **109** over the Internet or some other communication path to any search engine and database. The user preferably accesses the CGI software **105a** or search engine **108** with the browser **102** via the Internet by conventional methods and with the use of computer hardware and 10 software, or other devices or methods, as is or become known in the art.

10 The CGI software **105a** of this particular embodiment may be written in any computer language suitable for interaction with a search engine computer program **108** and browser **102** over the Internet, such as Visual Basic. The search engine **108** can be a conventional statistical based Internet search engine, as described above, or any other computer software or program instructions capable of interacting with the user, e.g., via CGI software **105a** and a browser **102** as described herein. One example of a search engine **108** that the present invention can be used with is the search engine located at URL address “www.dmoz.org.” However, any suitable search engine computer program that is or becomes known can be used with this embodiment.

15 The CGI software **105a** and search engine **108** can be made accessible to the user in any suitable manner. For example, the browser **102** can be connected with the CGI software **105a** and search engine **108** by the user connecting with the Internet and inputting, calling or selecting a URL address designated for the CGI software **105a**.

20 **FIG. 2** shows an example of a start screen, or front page, **200** that appears on the user’s computer screen, such as by being downloaded from the server computer **104a** to the browser **102** of **FIG. 1** after the user accesses the URL address which points to the

server computer 104a and downloads the front page file which is one of the files indicated by 105b. The user can interact with the front page 200 and provide input or select among various options. For example, the front page 200 can include a search query text area 201 where the user can enter a search string query, such as by typing in the key words to be searched. Any other suitable format or method for entering, inputting or selecting a search request with or without a front page 200 can be used.

The front page 200 can include other features or user options, such as a search quantity window 202 in which the user indicates the quantity of matching web sites from the search to be displayed or recovered. For example, the window 202 in this particular embodiment shows two textual alternatives from which the user selects, either the first numerically ranked matching “1-50 sites”, “1-100 sites” (not shown) or “all” (not shown), per search to be displayed. Different quantities of search results or a different format or mechanism for determining the number of matching web sites to be presented can be used. Further, other or different information can be requested on the front page 200, which can have any desirable format.

Still with reference to the embodiment of FIG. 2, after entering information in area 201 and selecting the quantity from window 202, the user can have the search executed, such as by selecting the text, or button, “Website Search” 203, or positioning the user’s computer pointer over the text “Website Search” 203 and clicking, as is conventionally known. Alternatively, the user can select the text, or button, “Category Search” 204, or positioning the user’s computer pointer over the text “Category Search” 204 and clicking, as is conventionally known. In this embodiment, selecting either the text “Website Search” 203 or “Category Search” 204 transmits the inputted information to the server side 104 for having the search engine 108 conduct a search based on the search string query entered in box 201. Any suitable method for enabling a user to have a search executed and for executing the search that is or becomes known in the art can be

used. The present invention is not limited in any way to the information on, format or method of use of start screen 200 shown in **FIG. 2**.

The invention can be designed so that at any time during viewing of unique web pages or screens provided in accordance with the present invention, the user can change 5 the search. In the preferred embodiment, the user can enter a different search string or select a different quantity of search results than previously entered and selected, execute a new search and view the corresponding search results. For example, items 201, 202, 203, and 204 can be included on numerous or every unique web page or screen provided to the user (see e.g. **FIGS. 4, 5, 6, 8, 9, 22, 23, and 24**).

In one aspect of the present invention, the search results are presented to the user or depicted on the user's computer display in a manner that is considered novel and useful. In one embodiment, the search results may be presented in multiple formats appearing simultaneously. For example, in the embodiment of **FIG. 3**, the search results are presented on the user's computer display in two formats: in frame 301, the search results are presented in the prior art search engine format(s) as generally described above, and in frame 302, the search results are presented in a format unique to the present invention. In this example, the contents of frame 301 can be downloaded directly from the search engine 108 in **FIG. 1** to the browser 102 and the contents of frame 302 can be downloaded from the CGI software 105a to the browser 102.

Frame 301 of the embodiment of **FIG. 3** includes both of the general search result formats described above with respect to prior art search engines, or variations thereof. For example, frame 301 of **FIG. 3** shows the standard search results page downloaded from the search engine that is accessible via URL address "www.dmoz.org". First, frame 301 of this embodiment shows the entire textual list of ranked matching web sites (not 25 shown) in numerical order with hyperlinks to each web site.

Second, frame 301 shows a textual list of category paths of the search results that

matched the search query (“cars”). Each category path can include a hyperlink to all web sites (matching and not matching) having that path, as is known in the art. For example, the words of the category path can be such a hyperlink. Alternately or additionally, a hyperlink to the matching web sites having that category path can be provided, such as a textual reference to the web sites, such as the textual reference “5 matches” or the numerical reference “30” shown in frame 301 of **FIG. 3**. However, frame 301 can be in any suitable format or need not even be included. The search results need not be displayed in multiple formats on the same screen, or web page. The present invention is thus not limited to having two frames, such as frames 301 and 302 of **FIG. 3**, and can have one frame, or more than two frames, or any other suitable format.

Still referring to **FIG. 3**, the right frame 302 of this embodiment is used to display the search results in a format in accordance with an embodiment of the present invention. In accordance with the present invention, graphics, color, text, organization, location and other attributes are used to display search results and, if it is desired, to lead to or present additional information. For example, an extended list of matching web sites for the selected search can be depicted in a single web page. Further, each such web site can, if desired, be shown in the context of its parent category. An example of such a format is web page 305 shown in frame 302 of **FIG. 3**, which is a “Website Search” results page. Another example would be where an extended list of matching categories for the selected search can be depicted in a single page. An example of such a format is web page 2105 shown in frame 302 of **FIG. 21**, which is a “Category Search” results page.

The example page 305 of **FIG. 3** (“Website Search”) is shown in its entirety in **FIG. 4**, which may be referred to herein as a “category page” or “parent category page” 305. As shown in **FIG. 4**, each matching web site for the search request in this embodiment is represented by its rank number. In the example shown, each matching web site or data element is represented by a bulb-like category member icon 402 having

the web site's relative rank number depicted therein, such graphical representation referred to herein as a "web site icon or category member icon,"

Still referring to the embodiment of **FIG. 4**, each depicted web site **402** is shown on page **305** as being a member of the parent category **420** within which it belongs.

- 5 Referring to **FIG 4**, for example, the web site icons **402** for all of the selected number of matching web sites falling within each parent category **420**("REGIONAL", "BUSINESS", "HOME", etc...) are grouped together and have the same color. Thus, color and organization are used in this example as indicating membership in a certain parent category. Adjacent each grouping of web site icons **402** in this embodiment is a
10 textual representation of the parent category name **403**. A category icon is preferably a border, such as a circle, **410**, shown surrounding each group of web site icons **402** and parent category name **403**. Category icons may be shaped to represent the category they represent, that is, the shape of a telephone for a category comprising a group of telephone numbers, a football for a category comprising a group of football players, or an icon shaped like a baseball, shopping basket or car for relevant categories. The entire display
15 for each depicted parent category **420** in this embodiment includes the border **410**, one or more matching web site icons **402** and the parent category name **403**, and may be referred to herein as a "parent category cluster" **420** or category icon. Advertisements may be placed inside of the category icons **420** or activated when a user places a cursor over a
20 category icon **420** or category member **402**.

The web site of each depicted web site icon **402** can be made accessible to the user. In the embodiment of **FIG. 4**, each web site icon **402** is a hyperlink to the web site being represented thereby, so that a user can access that web site upon selecting the icon **402**. In such case, the web site will be downloaded to the browser **102** (**FIG. 1**) and its
25 home page will appear on the user's computer display upon the user clicking or selecting the icon **402**. Any other suitable format or method can be used to show or provide access

to matching web sites, if these features are desired.

In another aspect, pop-up windows and the like can be generated to appear on the user's computer display to provide information, links to other web pages or web sites, or other features such as picture, video and sound excerpts from the underlying total data or

5 relevant advertisements. Pop-up windows can be generated as is known in the art, such as with the use of any suitable pop-up window software that is or becomes known, such as the publicly available "OVERLIB" freeware written in Java Script. For example, in FIG. 4, positioning the user's computer mouse or pointer over any web site icon 402 (or other suitable access method) will cause a window 404 (shown for web site 39) to appear. In

10 this embodiment, window 404 shows a description of and hyperlink to the web site, but can provide any desirable information in any suitable format. In a preferred embodiment, positioning the cursor over any category member icon alternatively produces a thumbnail picture, video or audio excerpt representative of the underlying data element resident within the category member represented by the icon. A category member can be accessed by clicking on the icon representing the member. Category members that have been examined visibly change, e.g., from a color to a gray scale or change shape to eliminate unnecessary repetitive examination by the user. Unviewed element can also be made to emit a beeping sound that grows louder as the cursor becomes nearer to them within the category icon. These features are particularly useful when viewing or

15 reviewing 1000's of data elements which may cover a wide display area larger than the user screen when zoomed down to the data element level. For example, a search may turn up 1000 suspects pictures which a crime witness must review individually to make a positive identification. The ability to discern reviewed and unreviewed elements speeds up the task by eliminating a second review of data elements. Data elements which are

20 viewed and deemed relevant for further review can be marked to appear in a third color or shape for further review.

25

The present invention can also place thousands of data elements in a hierarchical order by category by reviewing the elements and entering a category name. The data elements are subsequently displayed in category and subcategory icons. For example, a reviewer can look at 1000 pictures and classify them in 6 categories such as Man, Woman, Child, White, Black, Asian, etc. for subsequent display.

As shown in Figures 4, 5, and 6, the category members or data elements are each represented explicitly by a category member icon. The presentation method is referred to as the “explicit” GUI option. As shown in Figures 22, 23, and 24, the category members or data elements are represented implicitly by a number representing the quantity of data elements or category members within the category. The presentation method is referred to as the “implicit” GUI option.

In another aspect of the invention, color can be used to indicate whether any of the matching web sites in a depicted (parent or child) category have any uncommon subcategories. In the embodiment of **FIG. 4**, each of the parent category names 403 (or abbreviations thereof) are shown enclosed in a parent category icon 406. The color of the parent category icon 406 can be color coded, e.g., black (such as shown in **FIG. 4**) to indicate that at least one of the depicted matching web sites in that cluster 420 has a first (or lower) level subcategory in its category path that differs from at least one other depicted matching web site in that cluster 420. The parent category icon 406 can be a different color, such as gray (not shown), if there are no uncommon subcategories among the depicted matching web sites within a parent category or cluster 420 (see e.g., **FIG. 5**, subcategory icon 506 “AUCTIONS”).

In another example, matching web sites may be shown in the context of their respective first (or first uncommon) level subcategories. This can be accomplished in any suitable manner. In the embodiment of **FIG. 4**, for example, positioning the user’s computer mouse or pointer over a parent category name 403 will cause a pop-up window

to appear identifying the first uncommon level subcategories of the web sites of that parent category. For example, positioning the user's cursor over the parent category name **403** "SHOPPING" in the black category icon **406** will cause window **405** to appear. Window **405** includes a heading **408**, which is the parent category name ("Shopping") and the common category path of the depicted web sites.

Below the heading **408** is a textual listing of all of the first level subcategory names (or abbreviations thereof) for the depicted web sites in the "SHOPPING" category, namely "Vehicles", "Recreation and Hobbies", "Auctions", and "Sports." If all of the depicted matching web sites in that group were instead to have the same first level subcategory and possibly also the same further level subcategories, the heading **408** will include all such common subcategory name(s) (not shown), and the first uncommon, or next, level subcategories of the web sites will be listed in window **405** (see e.g. window **505**, FIG. 5).

The category icon **406** is color coded, e.g., gray, thus, the present invention is designed to indicate that additional web sites exist in the database(s) searched that matched the search query, or request, additional to the selected number (such as 1-50) of ranked sites, provides access to such additional matching web sites. For example, in the embodiment of FIG. 5, a pop-up window **504** will appear when the user positions the mouse cursor or pointer over the first level subcategory name **503** appearing in a first level subcategory icon **506** that is gray, such as the exemplary first level subcategory name **503** "AUCTIONS." In this example, the window **504** indicates that there are "10 MORE" additional matching web sites beyond the depicted matching web sites for that subcategory. This embodiment also provides a link to a list of all matching web sites. For example, the subcategory name **503** can be such a link. Thus, selecting or clicking on the name **503** will cause a list of the depicted and additional web sites to appear, such as shown in web page **701** of FIG. 7. Page **701** shows a textual listing of the previously

depicted matching web site(s) for “AUCTIONS” (web site # 33) and the additional matching web sites. The textual listing of each web site of this embodiment includes a description of and a hyperlink to each web site. In this embodiment, page 701 can be downloaded directly to the user’s browser 102 (**FIG. 1**), such as to frame 302 (**FIG. 3**), 5 from the search engine 108. However, the invention is not limited to this method of delivery.

Still referring to the example of **FIG. 4**, the depicted matching web sites of a parent category can also be depicted graphically, or with icons, in the context of their respective first (or first uncommon) level subcategories by selecting or clicking on a 10 parent category name 403. This causes a new web page, or screen, 501 (**FIG. 5**) to appear on the user’s display (such as by being downloaded to frame 302 of the user’s browser), showing the depicted matching web sites icons 402 of the selected parent category of **FIG. 4** in the context of their respective first (or first uncommon) level subcategories. In this example, the new first level subcategory page 501 appears upon the user selecting the 15 parent category name “SHOPPING” of **FIG. 4**, page 501 showing the web site icons 402 of parent category “SHOPPING” arranged in the context of their first level subcategories, which, in this example, includes “VEHICLES”, “SPORTS”, etc. The user of this embodiment can select any parent category name of parent category page 305 (**FIG. 4**) to cause a first level subcategory page (such as page 501 of **FIG. 5**) to appear. Any other or 20 additional suitable format or method for depicting matching web sites in the context of their respective subcategories can be used, if this feature is desired.

The subcategory pages, such as first level subcategory page 501, can have any desired format, features and capabilities, such as those described above with respect to page 305 and shown in **FIG. 4**. Thus, the features, format and capabilities of page, 305 25 and the entire description of the embodiment of **FIG. 4** and page 305 above apply to **FIG. 5** and page 501, except in the context of the first level subcategories instead of the

parent categories.

For example, the general format of page 501 (**FIG. 5**) of this embodiment is similar to the format of the web page, or display, 305 of **FIG. 4**, except the depicted web sites in **FIG. 5** are shown in the context of their respective first level subcategories. The 5 web site icons 402 of the selected parent category are thus shown in groups formed around their respective first level subcategory names (or abbreviations thereof) 503, forming “first level subcategory clusters” 520.

In another example, in the embodiment of **FIG. 5**, the web site icons 402 of each parent category is depicted in a common color, such as the same color used on page 305, 10 as shown in **FIG. 4**. In another example, a pop-up window (not shown) is provided in the same manner and with the same general information and features of window 404 of **FIG. 4**. In yet another example, the first level subcategory name 503 of each first level subcategory cluster 520 is shown in the same general manner and has similar general features as described above with respect to the parent category names 403, icons 406 and 15 clusters 420 of page 305.

Similarly as explained above for page 305 and shown in **FIG. 4**, the depicted matching web sites on a page 501 of this embodiment can be viewed in the context of their respective second or lower level subcategories. If at least one of the depicted web sites in a first level subcategory cluster 520 has a second (or lower uncommon) level 20 subcategory, the first level subcategory icon 506 is black. A pop-up window 505 showing a textual list of the second, or lower, level subcategory names (or abbreviations thereof) will appear in this embodiment upon positioning the user's mouse cursor or pointer over the first level subcategory name 503. For example, positioning the user's pointer over the first level subcategory name 503 “RECREATION” causes window 505 25 to appear. In window 505, the heading 508 includes “RECREATION AND HOBBIES: MODELS”, indicating that the complete first level subcategory name is “RECREATION

AND HOBBIES” and that each of the four depicted web sites has a common second level subcategory “MODELS”. Thus, the textual list in window 505, “Cars”, “Slot Cars” and “Radio Control”, are the third level subcategories for the depicted matching web sites.

Also similarly as described above with respect to **FIG. 4**, the depicted matching 5 web sites of a first level subcategory can also be shown graphically, or with icons, in the context of their respective second (or next uncommon) level subcategories by selecting or clicking on a first level subcategory name 503. In this embodiment, a new web page, or screen, such as page 601 (**FIG. 6**), will appear on the user’s screen display (such as by being downloaded to frame 302 of the user’s browser), showing the depicted matching 10 web sites icons 402 of the selected first level subcategory of **FIG. 5** in the context of their respective second (or next uncommon) level subcategories.

In the depicted example, selecting the first level subcategory name 503 “RECREATION” on page 501 (**FIG. 5**) will cause page 601 (**FIG. 6**) to appear. In this particular instance, the depicted matching web sites (#8, 10, 16 and 27) are shown in the 15 context of their *third* level subcategories (“Cars”, “Slot Cars”, “Radio Control”), because they have a common second level subcategory “Models”, as explained above. The invention can be designed so that a similar formatted page, or screen, would appear showing the respective matching web sites for each first level subcategory shown in **FIG.**

5. Thus, the user of this embodiment can select any first level subcategory name 503 of 20 page 501 (**FIG. 4**) to cause the next uncommon level subcategory page (similar to page 601 of **FIG. 6**) to appear. Any other or additional suitable format or method for depicting matching web sites in the context of their respective various level subcategories can be used, if this feature is desired.

In another aspect of the invention, referring again to **FIG. 5**, the common portion 25 of the respective category path (or an abbreviation thereof) for each depicted matching web site on a page is shown. In this embodiment, the heading “SHOPPING” 509 reflects

the common portion of the category path of all web sites shown on page 501. In FIG. 6, the common portion of the category path of the depicted web sites is shown as heading 609. In the example shown, the heading 609 is “Shopping: Recreation and Hobbies: Models”, which reflects the common parent category and first and second subcategories 5 for the depicted web sites and is shown in the same color as the web site icons 402.

The headings 509, 609 etc. can, if desired, be used to access further information. For example, referring to FIG. 5, the heading 509 is a hyperlink that can be selected to cause a textual list (web page 1201, FIG. 12) of all subcategories of the common category path or heading 509 to appear on the user’s computer display. On exemplary 10 page 1201, all subcategories of the parent category “SHOPPING” in the entire database(s) searched by the search engine are listed. In the preferred embodiment, page 1201 is downloaded to frame 302 of the user’s browser 102 (FIG. 1) directly from the search engine 108, such as via path 109. Further, each subcategory name on page 1201 is a hyperlink to another page showing further information. For example, selecting a 15 subcategory name on page 1201 causes a list of all of the subcategories of the selected subcategory to be shown. The new page (not shown) can be in the same general format and have the same general features as page 1201.

Referring now to FIG. 6, page 601 has the same basic format, features and capabilities as described above and shown in FIGS. 4 and 5. Thus, the entire description 20 of FIGS. 4 and 5 above applies to FIG. 6 and page 601, but in the context of the third level subcategories. From page 601, matching web sites could be shown in the context of their next uncommon level subcategories and so on, until the last subcategory for each matching web site is shown. In each case and for each new page, the above formats and capabilities could, if desired, be applied.

25 In another aspect of the present invention, the user of this embodiment can navigate back and forth between previously viewed pages or screens, such as with the use

of the “BACK” and “FORWARD” buttons or arrows typically appearing on a user’s computer display or provided by the browser software, or by any other method that is or becomes known. New or different pages, or screens, can be viewed or a new or different path navigated through the search results pages, or category tree, such as by using
5 methods described above.

In yet another aspect of the invention, the user is notified when there are no further matching web sites for a subcategory in the entire database(s) searched. For example, on web page 801 of **FIG. 8**, the color of the subcategory name 803 is shown in a different color, such as black (the other subcategory names are shown in this
10 embodiment in white). In **FIG. 8**, the subcategory name 803 “TOURING CARS” is shown in black, which indicates that there are no additional matching web sites in that subcategory in the database(s) searched. Thus, in the example shown, only web site 6 matched the search query having the category path “Sports: Auto Racing: Touring Cars”.
15

Any other suitable method or format may be used to show when there are no additional matching web sites for a category path or subcategory, if such feature is desired. For example, in the embodiment of **FIG. 8**, positioning the user’s mouse cursor or pointer over a subcategory name 803 for category path having no further sub-categories or matching web sites will cause pop-up window 802 to appear. As shown,
20 the window 802 includes a textual statement that there are no further matching web sites.
15

In still another aspect of the invention, search results are viewable in various alternate formats, such as graphical, textual, and/or mixed graphical/textual formats. For example, the embodiments of pages 305 (**FIG. 4**), 501 (**FIG. 5**), 601 (**FIG. 6**) and 801 (**FIG. 8**) are web pages or screens that are generated, downloaded and shown in a primarily graphical format.
20

25 In contrast, **FIG. 9** shows an example of a web page 900 in primarily textual format. Page 900 shows the same search results as shown on page 501 of **FIG. 5** and has

the same general features. In the example of page 900, the depicted matching web sites are grouped together by their respective first level subcategories, similar to those shown in **FIG. 5**. The respective subcategory names 503 appear at the top of each grouping, such as “SPORTS: AUTO RACING”, “VEHICLES”, “AUCTIONS”. Each matching
5 web site is indicated by the site’s rank number 901 and the web sites in each subcategory group are listed sequentially in numerical rank order. A hyperlink 902 to the web site and a description 903 of the site is also included. Further, each subcategory name 503 of this embodiment, possesses the same features, link properties and pop-up window capabilities as the subcategory names 503 on page 501 of **FIG. 5**. Primarily textual pages similar to
10 page 900 can be included for each parent category and subcategory in addition to or instead of the corresponding primarily graphical pages, such as pages 305, 501, 601 and 801. However, any other suitable format and capabilities for showing search results may be used, if this feature is desired.

The present invention can be designed so that the user can move back and forth
15 between different formats. In the embodiments shown, the user can move between graphical and textual formats of the same search results, such as between pages 501 and 900. For example, each primarily graphical page, such as page 501 of **FIG. 5** can include
20 a mechanism, such as the “TEXT” button, or icon, 407, that the user can select to view the search results in a primarily textual format, such as page 900 of **FIG. 9**. Clicking on “TEXT” icon 407 of page 501 in **FIG. 5**, for example, results in the downloading and subsequent display of page 900 of **FIG. 9**. The reverse occurs in this embodiment by the user selecting the “GRAPHICS” button, or icon, 906 shown on page 900. Clicking on the “GRAPHICS” icon 906 will cause the same search results to be shown in a graphical format, such as page 501 of **FIG. 5**.

25 It should be understood that any of the above features and/or capabilities can be applied to any page or display provided in frame 302, or for any parent category or

subcategory. However, none of the above features is required. Different formats, features and methods may be used to provide the same or other information or capabilities. The present invention is thus not limited to the methods, formats and capabilities described above. For example, page 2105 of FIG. 21 (“Category Search”) is

5 shown in its entirety in FIG. 22. This method of displaying the search results is similar to the “Website Search” method (FIG. 4) except that there are no matching websites icons displayed along with the matching categories. By excluding the first 50 (or 100) matching websites, there is no longer the restriction of displaying only those categories which contain one of the first 50 (or 100) matching websites. This allows for more
10 categories to be displayed and thus ultimately more matching websites. Note that in this embodiment of the present invention this method of search results display utilizes only the first 100 unique category paths, which in this case corresponds to the 11 parent categories shown in FIG. 22. A larger number or all of the unique category paths may be selected for display. This “Category Search” page correlates to FIG. 4 for the “Website
15 Search” page. Note that in this method a circle 2210 surrounds each parent category 403 and site total 2205 to form a “parent category circle” 2220. The site total 2205 shows the total number of matching websites within this parent category. By positioning the mouse cursor over a parent category 403 a pop-up window 405 appears in the same fashion as the “Website Search” page shown in FIG. 4. This pop-window displays the parent
20 category 408 followed by the second-level subcategories below the current parent category. Identical to the “Website Search” page in FIG. 4, by clicking on the category name 403, for example “Shopping”, a new web page 2301 will be downloaded into frame 302 as seen in FIG. 23 which correlates to FIG. 5 for the “Website Search” page. If a category has no more than 1 subcategory path below it, then this is indicated by a circle
25 2310 with a black ring and dark colored center as opposed to the usual dark colored ring and light center color (eg. “Auctions”). If the user positions the mouse cursor over such a

category, for example “Auctions”, a pop-up window **504** will appear which will indicate that the user can view the total number of matching websites **2305** in this category path.

Identical to the “Website Search” page in **FIG. 5**, by clicking on such a “dead end” category name **503**, for example “Auctions”, a new web page **701** will be displayed

5 listing the matching websites for the current category path. This is the identical web page displayed for the “Website Search” link in **FIG. 4** for the “Auctions” category. Just as before, the names of the listed websites are linked to their web page addresses, therefore if the user clicks on one of these website names, that website will be downloaded to the user’s browser. Referring again to **FIG. 23**, by positioning the mouse cursor over a

10 second-level category **503**, for example “Recreation”, a pop-up window **505** appears in the same fashion as the “Website Search” page shown in **FIG. 5**. This pop-window displays the category name **508** followed by the subcategories below the current category. By clicking on this category a new web page **2401** in **FIG. 24** will be displayed. This web page corresponds to **FIG. 6** for the “Website Search”.

15 In one embodiment, the present invention includes Graphical User Interface script software (“GUI script software”) (not shown), which can be written, for example in Visual Basic Script or any other suitable programming language. Generally, the GUI

script software is at least partially generated, or written, by the CGI software **105a** (**FIG.**

1) based upon the search results from the search engine **108** and contains the HTML code

20 for all unique web pages for the search results. The GUI script software, in this example, is downloaded from the CGI software **105a** to the client system **101**. Upon the user’s request for a particular unique web page, the GUI script software of this embodiment provides the browser **102** with the HTML code for that page for the browser **102** to render, or create, the web page in frame **302**.

25 Referring to **FIG. 3**, the GUI script software in this example is downloaded from the CGI software **105a** into a “hidden” frame **304** (**FIG. 3**) in the user’s browser software

102. The hidden frame 304 could be designed with a very small width and physically located proximate to the far left margin 303 of frame 301 (FIG. 3) so that it is not visible to the naked eye. The embodiment of FIG. 3 thus utilizes a total of three frames, hidden frame 304, frame 301 showing search results in prior art format and frame 302 showing 5 search results in unique formats in accordance with the invention (and possibly also in prior art and other formats). The hidden frame 304 could be identified as “Frame 1”, frame 302 identified as “Frame 2” and frame 301 identified as “Frame 3.” Any other suitable alternate software or other mechanism for generating and downloading the desired web pages may be used.

10 **FIG. 10** depicts the general format of an example of GUI script software that may be used with the present invention. Although the contents of this frame (as shown in **FIG. 10**) have been described up until now as one script program, technically the “program” consists of four distinct script modules. Each of these modules is written in the vbscript language. The distribution of these modules are as follows: module #1 15 consists of section 1001 in **FIG. 10**; module 2 consists of section 1002 in **FIG. 10**; module 3 consists of section 1003a in **FIG. 10** as well as each subroutine as denoted by items 1003b in **FIG. 10**; and module 4 consists of section 1004 in **FIG. 10**. Referring to **FIG. 10**, there are “n” number of subroutines 1003b, each such subroutine associated 20 with one unique web page provided by the present invention for the search results, such as pages 305 and 501 described above, out of a total of “n” possible web pages for the search results of a particular search. The function of each subroutine 1003b is to output the appropriate HTML code for its corresponding web page into frame 302.

As a reference in describing the operation of one embodiment of the invention, a complete list if all items 105a and 105b (in **FIG. 1**) residing on server 104a (in **FIG. 1**) 25 is denoted in TABLE 1 -

1. **Search.exe** (Main CGI program - 105a)
2. **Presearch.exe** (small CGI program which returns initial frameset web page upon entering a search string - 105a)

3. **Sublink.htm** (Initial page returned to Frame #2 - 105b)
 4. **Sublink.exe** (small CGI program which returns all subsequent pages to Frame
#2 - 105a)
 5. **ktsubs.vbs** (Subroutines called by script program in Frame #1- 105b)
 6. **overlib.js** (Script program that generates popup windows - freeware - 105b)
 7. **index.htm** (Front page - 105b)
 8. Assorted graphics files used in presentation of GUI. (105b)

TABLE 1

10 In operation in accordance with one embodiment of the invention, when the user
accesses the URL address for the server computer **104a** of **FIG. 1** of the present
invention, the front page file, **index.htm** (ITEM 7 of TABLE 1), is downloaded to the
user's browser **102** of **FIG. 1**. As demonstrated before, the generic representation of this
type of page is indicated by **FIG. 2**. The HTML code for the Form on this page is shown
in Table 2.

15
20
25
30
35

```
<FORM action="/cgi-bin/presearch.exe" method="GET">
<INPUT TYPE="TEXT" NAME="search" SIZE="35">
<INPUT TYPE="SUBMIT" VALUE="Search">
<SELECT NAME="nsites" SIZE="1">
<option>1-50 sites
<option>1-100 sites
</SELECT>
</FORM>
```

TABLE 2

This Form passes the search string (eg. "cars") to **Presearch.exe** (ITEM 2 of TABLE 1 and contained within **105a** of **FIG. 1**) on the server using the **GET** method, with the search string set to parameter **search** and the number of sites ("1-50 sites" or "1-100 sites") set to parameter **nsites**. **Presearch.exe** returns the following web page shown

below in Table 3 for the previous example in which a search is performed on "cars" -

```
<html>
<frameset cols=".001%,33%,*>
<frame name="frame1" src="/cgi-bin/search.exe?search=cars"
frameborder="no" scrolling="no" noresize>
<frame name="frame3" src="http://search.dmoz.org/cgi-
bin/search?search=cars">
<frame name="frame2" src="/sublink.htm">
</frameset>
```

</html>

TABLE 3

This page constitutes the frameset from which the three previously described
5 frames are defined. The **src** for Frame 1 is the main GUI program, **Search.exe** (ITEM 1
in TABLE 1 and contained within **105a** of **FIG. 1**), with the search string set to “cars”.
The **src** for Frame 3 is a direct call to the search engine (dmoz.org which corresponds to
108 in FIG. 1). The **src** for Frame 2 is the file, **Sublink.htm** (ITEM 3 in TABLE 1 and
contained within **105b** of **FIG. 1**). This file appears below in Table 4.

10 <html>
15 <body>
<form name="hform" method="GET" action="/cgi-bin/sublink.exe">
<input type="hidden" name="sub" value="1">
<input type="hidden" name="style" value="0">
</form>
</body>
</html>

TABLE 4

This file only contains a hidden form **hform** which links to the **Sublink.exe**
20 program (ITEM 4 in TABLE 1 and contained within **105a** of **FIG. 1**). When this form is
submitted, it passes the parameter **sub** with a value of 1 and the parameter **style** with a
value of 0 to **Sublink.exe** using the **GET** method. **sub=1** indicates **Sub link1** (1003b in
FIG. 10) which will render the very first interface page; and **style=0** indicates a GUI
25 versus a textual user interface. This hidden form is submitted by Frame 1 once all four
script modules are completely downloaded. This is implemented by monitoring the
Top.Status variable in Frame 1. As indicated by section **1001** in **FIG. 10**, which is script
module 1, initially Frame 1 resets **Top.Status** (by storing the null string “”). This is
shown in more detail by **FIG. 13** (“Website Search”) and **FIG. 25** (“Category Search”)
30 both of which lists the first 34 and 21 lines, respectively, of the contents of Frame 1.
Section **1001** of **FIG. 10**, script module 1, is embodied by LINES **1303-1305** of **FIG. 13**
and LINES **2503-2505** of **FIG. 25**. Once all four script modules are downloaded into

Frame 1, Frame 2 is “reloaded” and the **Top.Status** variable is set to “**ok1**”, as indicated by section **1004** of **FIG. 10**, which is script module 4. The code for script module 4 appears in **FIG. 14**. When the contents of all three frames (Frame 1, Frame 2, and Frame 3) are initially downloaded, **Top.frame2.History.Length** is 0. Therefore, LINE **1403** of
5 **FIG. 14** is executed - which submits **hform** in Frame 2, which currently contains **sublink.htm**. Submitting this form represents the “reloading” of Frame 2. **Top.Status** is then set to “**ok1**” (LINE **1409**) to indicate that Frame 1 has completely downloaded. As mentioned above, when **hform** is submitted, it passes the parameter **sub** with a value of **1** and the parameter **style** with a value of **0** to **Sublink.exe** on the server. Then
10 **Sublink.exe** returns the web page listed in **FIG. 15a** to Frame 2. LINE **1503** sets up a style sheet **ID** called **overDiv**. This **ID** is utilized by the popup window program for positioning the popup windows over the other graphics on the displayed page.

In LINE **1504** of **FIG. 15a** the script program **overlib.js** (ITEM 6 in TABLE 1) is downloaded from the server. This script program, which is written in the javascript language, displays the popup windows as indicated by **404** and **405** in **FIG.4** and **FIG. 22**. This is a freeware program whose only function is to display popup windows.

LINES **1505-1508** in **FIG. 15a** contain a hidden form **hform** which links to the **Sublink.exe** program on the server passing the parameter **sub** with a value of **1** and the parameter **style** with a value of **0**. This indicates **Sub link1** (**sub=1**) and a GUI (**style=0**).

20 LINES **1509-1512** in **FIG. 15a** contain a hidden form **hform1** which links to the **Sublink.exe** program on the server passing the parameter **sub** with a value of **1** and the parameter **style** with a value of **1**. This indicates **Sub link1** (**sub=1**) and a textual user interface (**style=1**). LINES **1513-1519** in **FIG. 15a** contain a script program (written in the vbscript language) which is automatically executed upon the loading of this web page. Since **Top.Status** has been set to “**ok1**” at this point (as described above), then
25 LINE **1515** is executed. This command calls **Sub link1** in Frame 1 passing a value of **0**.

This value is the **style** parameter and indicates a GUI as opposed to a textual user interface. At this point **Sub link1** in Frame 1 writes the HTML code, which is necessary to render the first GUI (**FIG. 4** or **FIG. 22**), to Frame 2.

When the user clicks on the TEXT button (**407** in **FIG. 4**), hidden form **hform1**

5 (LINES **1509-1512**) will be submitted. This form calls the **Sublink.exe** program on the server passing the parameter **sub** with a value of **1** (**Sub link1**) and the parameter **style** with a value of **1** (textual user interface). **Sublink.exe** will return a new web page which appears in **FIG. 15b**. The only difference between **FIG. 15a** and **FIG. 15b** is that the style parameter is reversed in LINES **1507**, **1511**, and **1515**. If the value is **0** in **FIG. 15a** then it is **1** in **FIG. 15b** and vice versa. Just as with the web page of **FIG. 15a**, the script program in LINES **1513-1519** of **FIG. 15b** is automatically executed upon loading of the web page. Since **Top.Status** is still set to “**ok1**”, LINE **1515** is executed. This command calls **Sub link1** in Frame 1 passing a value of **1**. This value is the **style** parameter and indicates a textual user interface as opposed to a GUI. At this point **Sub link1** in Frame 1 10 writes the HTML code, which is necessary to render the first textual user interface, to Frame 2. Note that for the “Category Search” situation, only **FIG. 15a** will be utilized since there is no “TEXT” or “GRAPHICS” buttons on any such GUI pages from which **hform1** could be submitted.

If the user, after viewing the initial interface page, subsequently links to another

20 interface page or website, and then clicks the Back button on the browser, then all three frames will be reloaded simultaneously. LINE **1304** of **FIG. 13** (“Website Search”) or LINE **2504** of **FIG. 25** (“Category Search”), which is the single command of script module 1 that resides in Frame 1, will almost certainly be executed before LINE **1514** of **FIG. 15a** (or **FIG. 15b**), which resides in Frame 2. It is also apparent that LINE **1514** is 25 likely to be executed before LINE **1402** of **FIG. 14**. **FIG. 14** shows script module 4 of Frame 1. This script program is not loaded until the previous three script modules in

Frame 1 are loaded. Thus, when LINE **1514** is executed, **Top.Status** will have been reset (at LINE **1304** or LINE **2504**), and therefore, LINE **1517** is executed which sets **Top.Status** to “**ok2**”. Then when LINE **1402** is executed **Top.frame2.History.Length** will be greater than **0** since at least one page (**sublink.htm**) has been loaded into Frame 2.

- 5 Hence, LINE **1405** will be executed and since **Top.Status** has been set to “**ok2**” then LINE **1406** will be executed followed by the execution of LINE **1409** which sets **Top.Status** to “**ok1**”. When LINE **1406** is executed then hidden form **hform** in Frame 2 is submitted. If the previous interface page was a GUI style interface then **hform** is shown in LINES **1505-1508** in **FIG. 15a**, else if the previous page was a textual style interface then **hform** is shown in LINES **1505-1508** in **FIG. 15b**. When submitted, this form calls the **Sublink.exe** program on the server passing the parameter **sub** with a value of **1 (Sub link1)** and the parameter **style** with a value of **0** (GUI) in **FIG. 15a** or a value of **1** (textual user interface) in **FIG. 15b**. **Sublink.exe** will return a new web page which is an absolute duplicate of the current page in Frame 2. By the time this new web page is loaded into Frame 2, LINE **1409** (as previously mentioned) will have already executed in Frame 1. So when LINE **1514** is executed in Frame 2 **Top.Status** is set to “**ok1**”. Therefore, LINE **1515** will be executed. The execution of this command, as explained earlier, calls **Sub link1** in Frame 1 passing a value of **0** (GUI) for FIG. 15a or a value of **1** (textual user interface) for **FIG. 15b**. At this point **Sub link1** in Frame 1 writes the 10 HTML code, which is necessary to render the GUI or textual user interface, to Frame 2.
- 15
- 20

It should be noted that while the previous explanation of the interaction between Frame 1 and Frame 2, while utilizing **FIG. 15a** (or **FIG. 15b**), has been restricted to the first interface (**Sub link1**), the function is the same with all other interface pages. The only difference would be the setting of the **sub** parameter in the forms (**hform** and 25 **hform1**) and the spelling of the subroutine call (LINE **1515**).

For instance, for **Sub link2**, LINES **1506** and **1510** would set **value=“2”** and the

subroutine call in LINE 1515 would be spelled as **parent.frame1.link2**.

Referring to **FIG. 10** and **FIG. 13** or **FIG. 25**, after script module 1 (Section 1001 in **FIG. 10** and LINES 1303-1305 in **FIG. 13** or LINES 2503-2505 in **FIG. 25**) is loaded in Frame 1, script module 2 is loaded (Section 1002 in **FIG. 10** and LINE 1306 or LINE 2506). This script module is stored in a separate file on the server - **ktsubs.vbs** (ITEM 5 in TABLE 1) - and is downloaded from there. This file contains several standard subroutines which are called by each main subroutine (1003b in **FIG. 10**). The reason these standard subroutines are stored in a separate file is because they are static - they never change. These standard subroutines are listed in TABLE 5.

- 10 1. **OutputHeader**
- 15 2. **OutputRing**
- 15 3. **OutputOval**
- 15 4. **OutputDots**
- 15 5. **OutputCircle**

TABLE 5

After this file is downloaded, script module 3 is loaded beginning at LINE 1307 of **FIG. 13** (“Website Search”) or LINE 2507 of **FIG. 25** (“Category Search”). As described earlier, this script module contains all of the subroutines which render each and every possible interface page for the search results. For simplicity, **FIG. 13** only lists the declaration of the global variables and the initialization of the pertinent global variables (**capray**, **textray**, **linkray**, and **catray**) for the first 5 websites, out of a total of 50 websites, for a “Website Search” (Section 1003a in **FIG. 10** and LINES 1308-1336 in **FIG. 13**). There are seven global variables (LINES 1308-1314) which are one-dimensional arrays that store various information for each website. There are no global website variables to initialize for a “Category Search” since there are no websites to display, therefore **FIG. 25** only lists the first GUI subroutine, **Sub link1** (Section 1003a in **FIG. 10** and LINES 2508-2521 in **FIG. 25**). Note that the complete listing of all of the GUI subroutines would be too long to list.

In **FIG. 13** (“Website Search”), the global arrays contain 50 elements each, since there are a maximum of 50 websites in this example (since the 1-50 websites option was chosen). **capray** stores the title/caption of the website. **textray** stores the general text description of the site. **linkray** stores the URL link which is the internet address for the website. **catray** stores the category path for the website. **dotindx** stores the list of indexes of the particular websites contained in any given cluster at the time that cluster is output. The two remaining global variables, **xray** and **yray**, store the 2-dimensional location (relative to the center of each cluster) of each website icon on the screen. The values of these two variables are set inside of each subroutine (**1003b** in **FIG. 10**) since the position of each website icon changes with each GUI page. LINES **1315-1334** in **FIG. 13** show how the pertinent global variables for defining each website (excluding **xray** and **yray**) are initialized for the first 5 websites.

After initializing all of the pertinent global variables in Frame 1, all of the subroutines for rendering each and every GUI page are exported to Frame 1. These subroutines are indicated as items **1003b** in **FIG. 10**.

Using the GUI page indicated in **FIG. 5** (“Website Search”) as an example, the subroutine for rendering this page is listed in **FIG. 18**. Notice that the first line (LINE **18001**) of this subroutine calls subroutine **OutputHeader** (ITEM 1 of TABLE 2). Note that in this instance the **style** parameter would be set to **0** to indicate a GUI interface. This standard subroutine outputs the portion of HTML, represented in **FIG. 5**, from the top of the page down to the line, “4 subcategories : 11 sites”.

Referring to **FIG. 5** and **FIG. 18**, each of the four clusters in **FIG. 5** is indicated by three subroutine calls in **FIG. 18**: first a call to **OutputRing** (ITEM 2 of TABLE 2), next a call to **OutputOval** (ITEM 3 of TABLE 2), and then, after initializing the website index and the x-y position of each dot, a call to **OutputDots** (ITEM 4 of TABLE 2). Note that the method used for positioning the graphics in an x-y grid in the browser frame

window is the Cascading Style Sheets model, or CSS.

Now referring to the GUI page indicated in **FIG. 23** (“Category Search”) as an example, the subroutine for rendering this page is listed in **FIG. 26**. Note that for each “Category Search” subroutine call, the **style** parameter is set to **0** to indicate a GUI interface. Notice that the first link of this subroutine calls subroutine **OutputHeader** (ITEM 1 of TABLE 2). In this instance this subroutine outputs the portion of HTML, represented in **FIG. 23**, from the top of the page down to the line, “8 subcategories : 565 sites”. Referring again to **FIG. 23** and **FIG. 26**, each instance of a circle is represented by a call to subroutine **OutputCircle** (ITEM 5 of TABLE 2).

FIG. 11 is a flowchart showing various methods and capabilities of one embodiment of the invention utilizing CGI software and GUI script software as utilized from the client side (**101** of **FIG.1**). After understanding the acts described below, utilizing the software and methods described, these acts can be implemented by programmers of ordinary skill in the art without undue experimentation. In item **1101**, a request page, or screen (see e.g. **FIG. 2** or ITEM 7 of TABLE 1), is downloaded to the user’s browser software **102 (FIG. 1)** from the CGI software **105a** residing on the server **104a (FIG. 1)**. This download can be caused when the user enters the URL address of server **104a** in the browser’s address box, or other suitable methods. In item **1102**, in this embodiment, a user enters information, such as a search string, selects the number of results to display (for a “Website Search”, such as 50 or 100), and then selects either the “Website Search” button or the “Category Search” button, such as shown in **FIG. 2** and described above.

In this embodiment, in accordance with items **1103**, **1104** and **1107**, the CGI software downloads three frames to the user’s browser, via **Presearch.exe** (ITEM 2 in TABLE 1). Item **1104** of this embodiment involves downloading a minimal web page, **Sublink.htm** (ITEM 3 in TABLE 1), to Frame 2, which as described earlier contains a

hidden form, **hform**. This form could be described as an “initiation command”. Item 1107 of this example includes downloading Frame 3 (e.g. frame 301, **FIG. 3**), which can include a standard search results page of the search engine and have all the capabilities thereof. Item 1107, however, is not necessary for the present invention.

5 Item 1103 involves downloading Frame 1 (e.g. hidden frame 304 in **FIG. 3**) from the CGI software. This includes downloading GUI script software for providing the various screen images and text for the web pages that will be contained in Frame 2 (e.g. frame 302 in **FIG. 3**). The downloaded GUI script software includes subroutines Sub link1, Sub link 2, Sub link 3, etc. Sub link1 of this embodiment will generate the initial web page shown in Frame 2 (see e.g. page 305, **FIG. 4**), and each remaining subroutine will generate a separate web page to represent a different category or subcategory of the category tree of the search results, such as shown in **FIG. 5, 6, 8**.

In this embodiment, as shown in items 1105 and 1106, when item 1103 is complete (all necessary GUI script subroutines for rendering all possible web pages for Frame 2 are downloaded into Frame 1), then script module 4 (see 1004 in **FIG. 10** and **FIG. 14**) is downloaded into Frame 1 and executed. When this module is executed, as described earlier, **hform** in Frame 2 is submitted, indicating the execution of the “initiation command”. Upon submission of this form, **Sublink.exe** (ITEM 4 in TABLE 1) is called on the server (104 of **FIG. 1**), which returns the web page indicated in FIG. 15a. This page includes basic header information, a link to **overlib.js** (ITEM 6 in TABLE 1), which contains computer software code for generating pop-up windows and a command, Call parent.frame1.link1(0), which calls “Sub link1” located in the GUI script software in Frame 1. As described earlier, this command is executed and as a result, Sub link1 in Frame 1 is executed. As a result an initial category, or search results, web page (e.g. page 305, **FIG. 4**) is downloaded and shown in Frame 2. Thereafter, in accordance with this embodiment, the user may view any pertinent subsequent or alternate category

web pages in Frame 2, available pop-up windows, web sites or other linked pages, or any other information available via Frames 2 or 3 (such as those activities shown in the bottom half of the flowchart of FIG. 11).

For example, in the case of a “Website Search”, as indicated by item 1117, item 5 1108 shows three of the events that the user can initiate in accordance with this embodiment. In item 1109a, the user can cause the downloading and thus appearance of the web site of any matching web site indicated on a category page (Frame 2) by selecting a web site icon 402 or other link. This will initiate item 1109, where the selected web site will be downloaded to the user’s browser. The user can move back up 10 to item 1108 by conventional methods, such as with the “BACK” command or arrow associated with the user’s browser.

RIGHT SIDE OF FIGURE 11

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Referring to item 1110, the user can move between different category page formats. In this embodiment, according to item 1110, the user can move between generally graphical and textual formats by clicking on a “GRAPHICS” or “TEXT” button appearing on the depicted web page. As shown in item 1111, if the user clicks on a “TEXT” button, the GUI script software will execute the same subroutine that was called to render the current page (appearing in Frame 2), but instead with the command style=“TEXT”. This will cause the GUI script software to generate and load in Frame 2 a textual category page (see, e.g., FIG. 9) showing the same results as the previous graphical category page. Conversely, as shown in item 1112, if the user clicks on a “GRAPHICS” button, the same subroutine will again be called, except with style=“GRAPHICS”. This will cause the script software to generate and load in Frame 2, a generally graphical category page (see, e.g., FIGS. 4, 5, 6, 8) showing the same results as the previous textual category page. In either case, with this embodiment, after the new category page is loaded in Frame 2, the user is returned to item 1108.

Referring to item 1113, which applies to either a “Website Search” or a “Category

Search”, search results shown on a category page may be shown in the context of the next pertinent subcategory level. In item 1113, with regards to a “Website Search”, when the user selects a parent category name or a subcategory name (such as names 403 of **FIG. 4**, 503 of **FIG. 5**) in white lettering, on a category icon (such as icons 406, 506) appearing in black, item 1114 will occur, indicating a “Live” category which has further subcategories beneath it. Similarly, in item 1113, with regards to a “Category Search”, when the user selects a parent category name or a subcategory name (such as names 403 of **FIG. 22**, 503 of **FIG. 23**) in a circle with a colored rim, item 1114 will also occur. In item 1114, a new subroutine of the GUI script software in Frame 1 will be called to render a new category page, which will be downloaded into Frame 2. This page will be displayed in the same format, either graphical or textual, as the format displayed on the previous page (where the selection was made). After the new page is loaded in Frame 2, the user is returned to state 1108.

As provided in item 1115, with regards to a “Website Search”, if the user clicks on a category or subcategory name over a category/subcategory icon shown in gray, indicating a “Dead” or “dead-end” category which has no more subcategories beneath it, a new category page (see e.g. **FIG. 7**) showing a list of all web sites in that category/subcategory that matched the search query will be downloaded to the browser. Similarly, in item 1115, with regards to a “Category Search”, if the user clicks on a category or subcategory name in a black-rimmed circle, a new category page (see e.g. **FIG. 7**) showing a list of all web sites in that category/subcategory that matched the search query will be downloaded to the browser. In item 1116, if the user clicks on a web site link included in the list, that web site will be downloaded to the browser as in item 1109. Each above act need not be included, or occur in the above order. Additional or different acts may be included.

Now referring to ITEM 1 in TABLE 1, **Search.exe**, the main CGI program which

resides on the server (105a of FIG. 1) and which imports the search results from the dmoz.org search engine (109 of FIG. 1) and exports to the user's browser (102 of FIG. 1), the various script programs and subroutines to render the previously described GUI and textual user interface pages. The search results from the dmoz.org search engine are 5 imported using a WINSOCK interface using the URL for a standard search results web page.

Referring to the "Website Search" method, the dmoz.org search results page for the first 20 matching web sites using "cars" as the search query is shown in FIG. 19. Note that after a listing of the first 5 matching "Open Directory Categories" is the first 10 20 matching "Open Directory Sites" of which the first 3 are shown in this figure. These "Open Directory Sites" are utilized for the "Website Search". This page is accessed by the URL "<http://search.dmoz.org/cgi-bin/search?search=cars>". The HTML which is returned, is parsed to extract the following five characteristics of each website and storing them into the appropriate array variables -

15 **capray** - The caption for the website (1901 in FIG. 19) **textray** - The textual description for the website (1902 in FIG. 19) **linkray** - The URL for the website (1903 in FIG. 19) **catray** - The category path for the website (1904 in FIG. 19) **catcntray** - The total number of matching websites in this category - used for dead-ends (1905 in FIG 19)

To obtain the next 20 matching websites the URL "<http://search.dmoz.org/cgi-bin/search?search=cars&jstart=21>" is accessed, and then the URL "<http://search.dmoz.org/cgi-bin/search?search=cars&jstart=41>" is accessed to obtain the next 20 matching websites of which only the first 10 are parsed since in this example we are assuming "1-50" sites. Note that these arrays (excluding **catcntray**) are exported to Frame #1 as indicated by 1003a in FIG. 10 and also as represented by the first 5 websites 25 in LINES 1315-1334 in FIG. 13.

Referring to the "Category Search" method, the dmoz.org search results page for the first 25 matching category paths using "cars" as the search query is shown in FIG. 27. This page is accessed by the URL "<http://search.dmoz.org/cgi-bin/search?search=cars&jstart=21>"

bin/search?search=cars&morecat=1”. The HTML which is returned, is parsed to extract the following two characteristics of each category path and storing them into the appropriate array variables -

catray - The category path (2701 in FIG. 27)

5 **catcntray** - The total number of matching websites in this category - used for dead-ends (2702 in FIG 27)

To obtain the next 25 matching websites the URL “http://search.dmoz.org/cgi-bin/search?search=cars&morecat=26” is accessed, and then the URL “http://search.dmoz.org/cgi-bin/search?search=cars&morecat=51” is accessed to obtain 10 the next 25 matching websites, and then the URL “http://search.dmoz.org/cgi-bin/search?search=cars&morecat=76” is accessed to obtain the last 25 matching websites for a total of 100.

Next, referring only to the **catray** array for the “Website Search” method - the category path for each website from 1-50 is listed in **FIG. 20**. First this list is sorted into

15 groups of common parent categories, as shown in Tables 6-11.

catray(4)=”Regional: Europe: United Kingdom: England: Suffolk: Ipswich: Business and Economy: Shopping: Cars”

catray(18)=”Regional: Europe: United Kingdom: England: Bristol: Business and Economy: Shopping: Cars”

20 catray(20)=”Regional: Europe: United Kingdom: Recreation and Sports: Sports: Motorsport: Touring Cars”

catray(21)=”Regional: Europe: United Kingdom: England: Bedfordshire: Bedford: Business and Economy: Cars”

catray(22)=”Regional: Europe: United Kingdom: Business and Economy: Shopping: Vehicles: Parts and Accessories”

25 catray(25)=”Regional: Europe: United Kingdom: England: Suffolk: Ipswich: Business and Economy: Shopping: Cars”

catray(30)=”Regional: Europe: United Kingdom: England: Bristol: Business and Economy: Shopping: Cars”

30 catray(31)=”Regional: Europe: United Kingdom: Recreation and Sports: Sports: Motorsport: Touring Cars”

TABLE 6

35 catray(32)=”Regional: Europe: United Kingdom: England: Bedfordshire: Bedford: Business and Economy: Cars”

catray(34)=”Regional: Europe: United Kingdom: England: Suffolk: Ipswich: Business and Economy: Shopping: Cars”

catray(37)="Regional: Europe: United Kingdom: England: Bristol: Business and Economy: Shopping: Cars"
catray(39)="Regional: Europe: United Kingdom: England: Suffolk: Ipswich: Business and Economy: Shopping: Cars"
5 catray(40)="Regional: Europe: United Kingdom: Recreation and Sports: Sports: Motorsport: Touring Cars"
catray(41)="Regional: Europe: United Kingdom: England: Bedfordshire: Bedford: Business and Economy: Cars"
catray(43)="Regional: Europe: United Kingdom: Business and Economy: Shopping: Vehicles: Parts and Accessories:
10 catray(46)="Regional: Europe: United Kingdom: England: Bristol: Business and Economy: Shopping: Cars"
catray(48)="Regional: Europe: United Kingdom: Recreation and Sports: Sports: Motorsport: Touring Cars"
15 catray(49)="Regional: Europe: United Kingdom: England: Bedfordshire: Bedford: Business and Economy: Cars"

TABLE 7

catray(7)="Shopping: Vehicles: Autos: Internet Sales"
catray(8)="Shopping: Recreation and Hobbies: Models: Cars"
20 catray(9)="Shopping: Vehicles: Directories"
catray(10)="Shopping: Recreation and Hobbies: Models: Slot Cars"
catray(11)="Shopping: Vehicles: Autos: Parts and Accessories: European Cars"
catray(12)="Shopping: Vehicles: Autos: Parts and Accessories: American Cars"
25 catray(16)="Shopping: Recreation and Hobbies: Models: Radio Control: Cars and Trucks"
catray(26)="Shopping: Vehicles: Autos: Classic"
catray(27)="Shopping: Recreation and Hobbies: Models: Slot Cars"
catray(33)="Shopping: Auctions: Autos"
30 catray(50)="Shopping: Sports: Auto Racing"

TABLE 8

catray(1)="Recreation: Autos: Enthusiasts: Kit Cars"
catray(2)="Recreation: Models: Scale: Cars"
35 catray(3)="Recreation: Models: RC: RC Cars"
catray(13)="Recreation: Autos: Enthusiasts: Exotic Cars"
catray(29)="Recreation: Collecting: Toys: Cars and Trucks"
catray(35)="Recreation: Autos: Enthusiasts: Muscle Cars"
catray(44)="Recreation: Travel: Reservations: Vehicles: Car Rentals: Exotic Cars"

TABLE 9

40 catray(5)="Sports: Auto Racing: Sprint Cars"
catray(6)="Sports: Auto Racing: Touring Cars"
catray(14)="Sports: Auto Racing: Drag Racing"
catray(45)="Sports: Auto Racing: Drag Racing"
45 catray(15)="Arts: Music: Bands and Artists: C: Cars, The"
catray(19)="Arts: Genres: Automotive: Art Cars"

TABLE 10

catray(17)="Home: Consumer Information: Automobiles: Advocacy and Protection"
catray(23)="Home: Consumer Information: Automobiles: Purchasing: By Class: Sports
5 Cars"
catray(24)="Home: Consumer Information: Automobiles: Purchasing: By Class: Luxury
Cars"
catray(36)="Business: Industries: Transportation: Auto Transport"
catray(38)="Business: Industries: Transportation: Trucking: Truck Transport: Pilot Car
10 Companies"
catray(42)="Business: Industries: Transportation: Auto Transport"
catray(28)="Society: Issues: Transportation: Roads, Cars and Trucks: Road Safety"
catray(47)="Society: Issues: Transportation: Roads, Cars and Trucks"

TABLE 11

15 Next, these groups of websites are used to create **Sub link1** (1003b in **FIG. 10**)

which is exported to Frame 1 and is represented by the GUI page in **FIG. 4**. Note that as far as positioning the dots around the ovals - for clusters with less than 7 dots, the dots are arranged symmetrically around and as close to the oval as possible. For clusters with at least 7 dots, the dots are arranged in a circle, or if needed, two circles around the oval.

20 Note also that a ring is chosen for each cluster that has a diameter slightly larger than the outer diameter of the dots. Note also that the method for positioning the clusters on the web page, is as follows - starting from the upper right corner, the clusters are positioned vertically in a zig-zag pattern, starting with the smallest cluster, "Society", followed by the largest cluster, "Regional", followed by the next 2 largest clusters after "Society", which are "Arts" and "Business", followed by the next smallest cluster after "Regional", which is "Shopping", followed by the next 2 largest clusters after "Business", which are "Home" and "Sports", followed by the next smallest cluster after "Shopping", which is "Recreation", then there are no more clusters left. So the zig-zag pattern is -

1. The Smallest cluster
2. The Largest cluster (of the remaining clusters)
3. The Smallest cluster (of the remaining clusters)
4. The Smallest cluster (of the remaining clusters)
5. Repeat 2-5 until no more clusters remain.

35 After **Sub link1** is exported to Frame #1, each of the clusters is subdivided into

further subcategory groups. For instance, referring to the above “Shopping” group of websites - after stripping of the parent category, “Shopping”, and sorting this list into groups of common second-level category names, you would have the following result

shown in Table 12.

5 catray(7)=“Vehicles: Autos: Internet Sales”
catray(9)=“Vehicles: Directories”
catray(11)=“Vehicles: Autos: Parts and Accessories: European Cars”
catray(12)=“Vehicles: Autos: Parts and Accessories: American Cars”
catray(26)=“Vehicles: Autos: Classic”

10 catray(8)=“Recreation and Hobbies: Models: Cars”

catray(10)=“Recreation and Hobbies: Models: Slot Cars”

catray(16)=“Recreation and Hobbies: Models: Radio Control: Cars and Trucks”

catray(27)=“Recreation and Hobbies: Models: Slot Cars”

15 catray(33)=“Auctions: Autos”

catray(50)=“Sports: Auto Racing”

TABLE 12

Next, these groups of websites are used to create **Sub link12** (1003b in FIG. 10) which is exported to Frame 1 and was previously listed in **FIG. 18**. This subroutine is represented by the GUI page in **FIG. 5**. Each one of these second-level groups is further subdivided into third-level, then fourth-level, etc. until every website’s category path has reached a “dead end”.

Next, referring only to the **catray** array for the “Category Search” method - the category path for the first 50 out of 100 matching categories is listed in **FIG. 28**. Note that the methodology for parsing, and sorting the “Category Search” category list is substantially the same as that used for the “Website Search” method. The method for arranging the circles on the web page are also similar to the arrangement of the rings for the “Website Search” method, without the website icons since they are not applicable to the “Category Search” method.

30 **FIG. 29** is a flowchart showing various methods and capabilities of one embodiment of the invention utilizing CGI software and GUI script software as utilized from the server side (104 of **FIG.1**). After understanding the acts below, and utilizing the

software and methods described, these acts can be implemented by programmers of ordinary skill in the art without undue experimentation. In item 2901, the main CGI program **Search.exe** (ITEM 1 in TABLE 1) receives the search string, the number of websites (1-50 or 1-100), and the search type (“Website Search” or “Category Search”) 5 after the user enters a search string, selects the number of websites, and clicks on one of the search buttons in his browser (see 201, 202, 203, and 204 in FIG. 2). In item 2902 the **Search.exe** program exports script module 1 to Frame 1 (see 1001 in FIG. 10 and LINES 1303-1305 of FIG. 13). In item 2903 **Search.exe** exports the **ktsubs.vbs** file (see 1002 in FIG. 10 and LINE 1306 of FIG. 13). In item 2904 **Search.exe** imports one page 10 of search results from the dmoz.org search engine. As indicated in item 2905, this process is repeated until the total number of required results are obtained. For a “Website Search” this number is either 50 or 100 matching websites depending on the selection of the user (see 202 of FIG. 2). For a “Category Search”, in the embodiment of the invention a total of 100 matching categories is the requisite total. Item 2906 and 2907 indicates that in the case of a “Website Search”, **Search.exe** will export the necessary 15 global variables which characterize each matching website (see 103a in FIG. 10 and LINES 1307-1334 in FIG. 13). Item 2908 represents the initialization of the subroutine count, **n**, which will be used to delineate each subroutine (see 103b in FIG. 10) which will define each and every possible GUI/textual user interface page. Item 2909 represents the parsing of the categories of the matching websites (“Website Search”) or 20 simply the matching categories (“Category Search”), and then the grouping of the matching categories into common parent-level groups. Next, as indicated in item 2910, after graphically arranging these groups of websites (“Website Search”) into clusters or categories (“Category Search”) into circles and arranging those clusters or circles on the 25 web page (as described earlier), **n** is incremented and **Sub link1** is exported to Frame #1. Next, as indicated in item 2911, the largest of these groups is selected. Next, as indicated

in item 2912, if this group is not a “dead-end” category (further subcategories), then the current top-level category is stripped off, as indicated by item 2913, and the process of items 2909, 2910, 2911, and 2912 are repeated. If the current group is a “dead-end” category (no more subcategories) then if there are more groups remaining at the current category level, as indicated in item 2914, then items 2911 and 2912 are repeated. If there are not anymore remaining groups at the current category level, then if the current category level is not the parent category level (the initial level of categories), as indicated by item 2915, then the current category level is “backed-up” by one category level to the category level which preceded it, as indicated by item 2916, and then item 2914 is repeated. If the current category level is the parent category level then all possible interface pages have been created and their corresponding subroutines have been exported to Frame 1. As indicated by item 2917 the **Search.exe** program exports script module 4 to Frame 1 (see 1004 in FIG. 10 and FIG. 14). Next, **Search.exe** finishes execution, as indicated by item 2918.

Figure 30 illustrates a generic XML Application Program Interface to import a list of “n” data elements from a database query engine. This API is useful with both the Implicit and Explicit GUI options. Figures 31 and 32 illustrate a specific XML API which may be used by the Implicit GUI option and which conserves bandwidth by importing “n” matching leaf nodes as shown in Figure 31, rather than “n” discrete data elements. The second attribute is a URL to access the particular list of matching data elements which are resident within that leaf node. When that URL is implemented a list of “n” data elements are returned as indicated in Figure 32. Figure 33 illustrates a generic representation of a typical interface with a database query engine versus the particular search engine indicated in Figure 1. Figures 16 and 17 illustrate a representation of a hybrid GUI option whereby any category within of a category search (“Implicit” GUI) which contain no more than 25 data elements, are implemented by the

“Explicit” GUI option. **Figure 16** is a combination of presentation modes shown in **Figures 4 and 22**, while **Figure 17** is a combination of presentation modes shown in **Figures 5 and 23**. **Figure 34** is a particular implementation whereby two levels of the hierarchy are presented at one time while still maintaining the aggregate data element presentation. **Figure 34** represents the “Shopping” mode with it’s matching children modes presented with it’s circle, along with it’s matching aggregate data elements.

While preferred embodiments of the present invention have been shown and described, modifications thereof can be made by one skilled in the art without departing from the spirit or teachings of this invention. The embodiments described herein are exemplary only and are not limiting. Many variations and modifications of this system and apparatus are possible and are within the scope of the invention. Accordingly, the scope of protection is not limited to the embodiments described herein. For example, in one embodiment of this invention, a textual, graphical, or aural advertisement is integrated into each GUI page by adding one more ring (or circle) and placing an advertiser’s icon or a brief description of the advertisement inside. By placing the mouse cursor over the description a pop-up window would appear with a more detailed description of the advertisement. By clicking on the description, the advertiser’s web page would be downloaded. In another embodiment of this invention, the top 10 ranked website icons could be graphically delineated from the rest of the ranked websites.

For example, the bulbs for the top 10 ranked sites could have black rings surrounding them so that the user could readily distinguish the top 10 websites from the rest of the bulbs. In another embodiment of the invention, the website descriptions could be downloaded from the server separately from the rest of the script software in Frame 1. In this embodiment all of the content necessary to render all of the GUI pages, except for the descriptions of each website, are downloaded into Frame 1. Note that these descriptions are the text displayed in the pop-up window whenever the mouse cursor is

positioned over a website icon. These descriptions take up a large portion of the content downloaded into Frame 1 and thus contribute greatly to any delay experienced by the user while waiting for the initial GUI to appear. In this embodiment, after all of the subroutines for rendering each and every GUI is downloaded into Frame 1, the first GUI interface (eg. **FIG. 4**) is rendered in Frame 2 just as before. However, each website icon would be white with a colored ring to indicate that the descriptions for each website is not yet available for viewing. If a user were to position the mouse cursor over such an icon, a pop-up window would indicate “Still downloading description” or something to that effect. Also, until all website descriptions are downloaded the “TEXT” button would be inactive.

Immediately upon rendering the first GUI page, the downloading of all of the website descriptions would begin downloading into a fourth frame, Frame 4. After each website description is downloaded the corresponding website icon would turn into the standard solid colored bulb to indicate that the description for that website is available. If the user were to position the mouse cursor over such a website icon, a pop-up window would appear with the corresponding textual description displayed. Note that in this embodiment, while the website descriptions are downloading, the user would still be able to navigate the GUI page(s) in all other aspects, excluding only the viewing of website descriptions (via pop-up windows) not yet downloaded and the linking to the corresponding website page.